

What is claimed is:

1. A microstrip antenna for use on a projectile comprising:
  - a dielectric substrate positioned on said projectile;
  - a generally rectangular shaped antenna element mounted on said dielectric substrate, said antenna element transmitting an S-Band radio frequency signal;
  - a pair of elongated mode suppression slots located within said antenna element, said pair of mode suppression slots being positioned parallel to one another within said antenna element, said pair of mode suppression slots being orientated in a direction for surface current flow on said antenna element to provide for substantial isolation for said antenna element from an L-Band radio frequency signal whenever said microstrip antenna receives said L-1 Band radio frequency signal from an external source; and
  - a plurality of equally spaced apart vias said plurality of vias being aligned adjacent one elongated edge of said antenna element, said plurality of vias allowing said antenna element to operate as a grounded  $1/4$  wavelength radiating antenna by shorting said antenna element to a ground plane positioned below said

dielectric substrate.

2. The microstrip antenna of claim 1 wherein said antenna element comprises a rectangular shaped copper antenna element.

3. The microstrip antenna of claim 1 wherein each of said pair of elongated slots has an overall length 0.64 inches and a width 0.020 inches.

4. The microstrip antenna of claim 1 wherein a first elongated slot of said pair of elongated slots is positioned approximately 0.3558 inches from one end of said antenna element, and a second elongated slot of said pair of elongated slots is positioned approximately 0.3558 inches from the opposite end of said antenna element.

5. The microstrip antenna of claim 1 wherein plurality of vias comprises eight vias which are spaced apart approximately 0.1045 inches.

6. The microstrip antenna of claim 5 wherein each of said eight vias is located approximately 0.5 inches from said one elongated edge of said antenna element.

7. The microstrip antenna of claim 7 wherein each of said eight vias comprises a copper plated through via which electrically shorts said antenna elements to said ground plane.

8. The microstrip antenna of claim 1 further comprising a copper transmission line connected to said antenna element, said copper transmission line being a signal input for said antenna element, said copper transmission line having a characteristic impedance of 100 ohms.

9. The microstrip antenna of claim 1 wherein said pair of elongated slots provide for an isolation of approximately 50 decibels at a first center frequency of 1.575 GHz and a second center frequency of 2.25 GHz.

10. The microstrip antenna of claim 1 wherein said antenna element has a length of 1.15 inches and a width of 0.735 inches.

11. A microstrip antenna for use on a projectile comprising:

a dielectric substrate positioned on said projectile;

a generally rectangular shaped antenna element mounted on  
said dielectric substrate, said antenna element  
transmitting an S-Band radio frequency signal;  
a pair of elongated mode suppression slots located within  
said antenna element, said pair of mode suppression  
slots being positioned parallel to one another within  
said antenna element, said pair of mode suppression  
slots being orientated in a direction for surface  
current flow on said antenna element to provide for  
substantial isolation for said antenna element from  
an L-Band radio frequency signal whenever said  
microstrip antenna receives said L-1 Band radio  
frequency signal from an external source;  
eight equally spaced apart vias, said eight vias being  
aligned adjacent one elongated edge of said antenna  
element, said eight vias allowing said antenna  
element to operate as a grounded  $1/4$  wavelength  
radiating antenna by shorting said antenna element to  
a ground plane positioned below said dielectric  
substrate, each of said eight vias consisting of a  
copper plated through hole which electrically shorts  
said antenna element to said ground plane;  
a copper transmission line connected to said antenna

element, said copper transmission line being a signal input for said antenna element, said copper transmission line having a characteristic impedance of 100 ohms; and  
said pair of elongated slots providing for an isolation of approximately 50 decibels at a first center frequency of 1.575 GHz and a second center frequency of 2.25 GHz.

12. The microstrip antenna of claim 11 wherein said antenna element comprises a rectangular shaped copper antenna element.

13. The microstrip antenna of claim 11 wherein each of said pair of elongated slots has an overall length 0.64 inches and a width 0.020 inches.

14. The microstrip antenna of claim 11 wherein a first elongated slot of said pair of elongated slots is positioned approximately 0.3558 inches from one end of said antenna element, and a second elongated slot of said pair of elongated slots is positioned approximately 0.3558 inches from the

opposite end of said antenna element.

15. The microstrip antenna of claim 11 wherein said eight vias are spaced apart approximately 0.1045 inches.

16. The microstrip antenna of claim 15 wherein each of said eight vias is located approximately 0.5 inches from said one elongated edge of said antenna element.

17. The microstrip antenna of claim 11 wherein said antenna element has a length of 1.15 inches and a width of 0.735 inches.

18. A microstrip antenna for use on a projectile comprising:

- a dielectric substrate positioned on said projectile;
- a generally rectangular shaped copper antenna element

- mounted on said dielectric substrate, said antenna element transmitting an S-Band radio frequency signal;

- a pair of elongated mode suppression slots located within said antenna element, said pair of mode suppression slots being positioned parallel to one another within

said antenna element, said pair of mode suppression slots being orientated in a direction for surface current flow on said antenna element to provide for substantial isolation for said antenna element from an L-Band radio frequency signal whenever said microstrip antenna receives said L-1 Band radio frequency signal from an external source, each of said pair of elongated slots having an overall length 0.64 inches and a width 0.020 inches; and eight equally spaced apart vias, said eight vias being aligned adjacent one elongated edge of said antenna element, said eight vias allowing said antenna element to operate as a grounded  $1/4$  wavelength radiating antenna by shorting said antenna element to a ground plane positioned below said dielectric substrate, each of said eight vias consisting of a copper plated through hole which electrically shorts said antenna element to said ground plane, said eight vias being spaced apart approximately 0.1045 inches from one another, each of said eight vias being located approximately 0.5 inches from said one elongated edge of said antenna element; a copper transmission line connected to said antenna

element, said copper transmission line being a signal input for said antenna element, said copper transmission line having a characteristic impedance of 100 ohms; and

said pair of elongated slots providing for an isolation of approximately 50 decibels at a first center frequency of 1.575 GHz and a second center frequency of 2.25 GHz.

19. The microstrip antenna of claim 18 wherein a first elongated slot of said pair of elongated slots is positioned approximately 0.3558 inches from one end of said antenna element, and a second elongated slot of said pair of elongated slots is positioned approximately 0.3558 inches from the opposite end of said antenna element.

20. The microstrip antenna of claim 18 wherein said antenna element has a length of 1.15 inches and a width of 0.735 inches.